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FUENTES HERNÁNDEZ(10) **Pub. No.: US 2019/0351524 A1**(43) **Pub. Date: Nov. 21, 2019**(54) **TOOL FOR CLEANING THE ROLLERS OF
CONTAINER- OR CAN-CLOSING
MACHINES***B24B 5/36* (2006.01)*B21B 28/02* (2006.01)*B24B 5/04* (2006.01)(71) Applicant: **Fernando FUENTES HERNÁNDEZ**,
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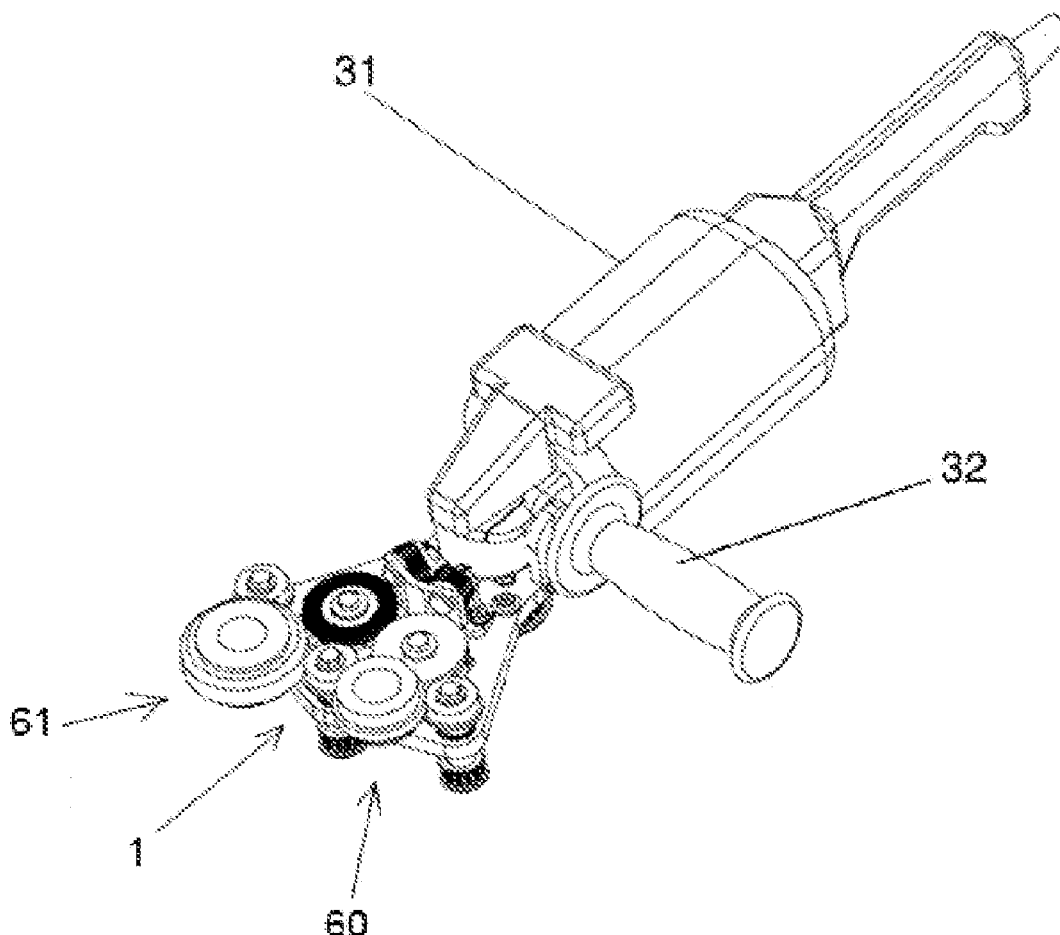
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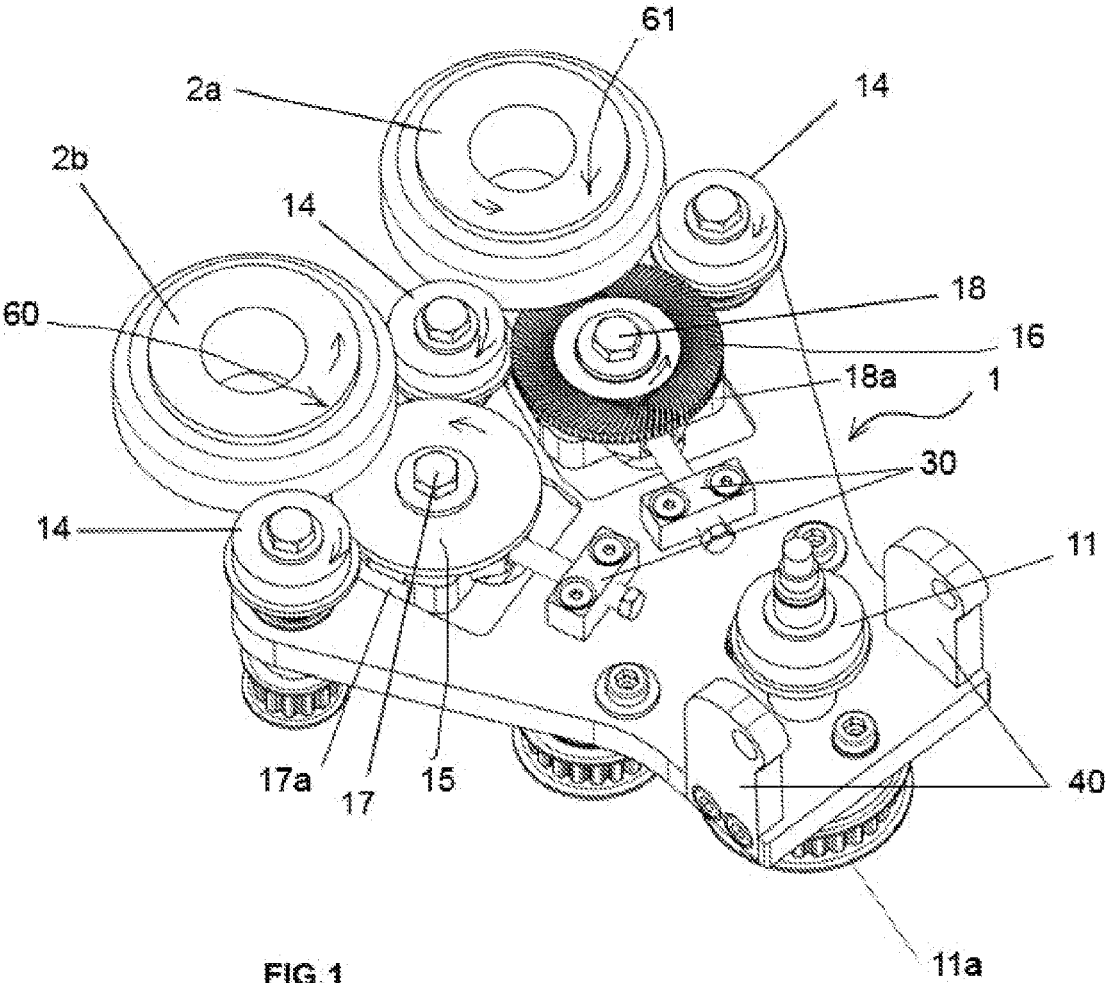
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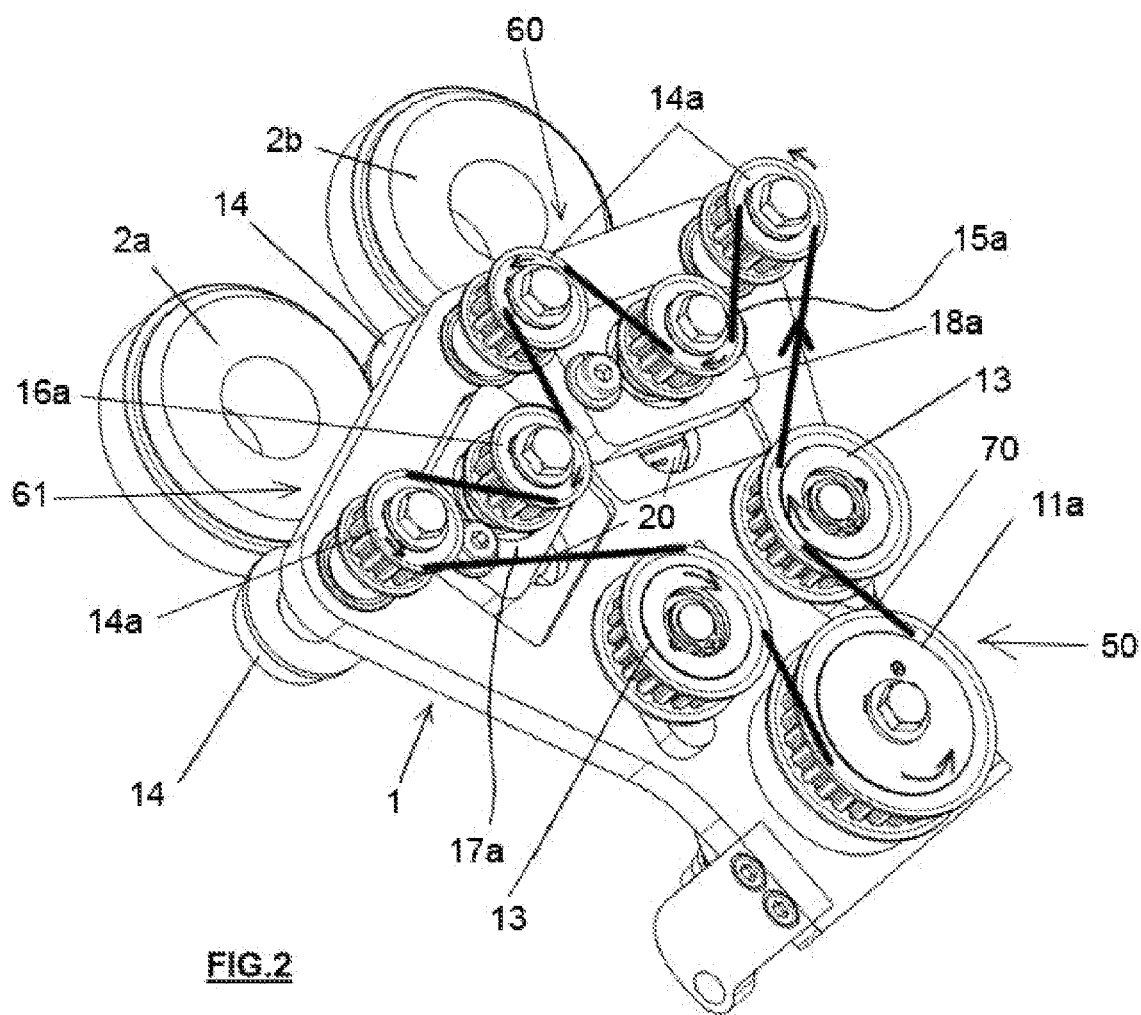
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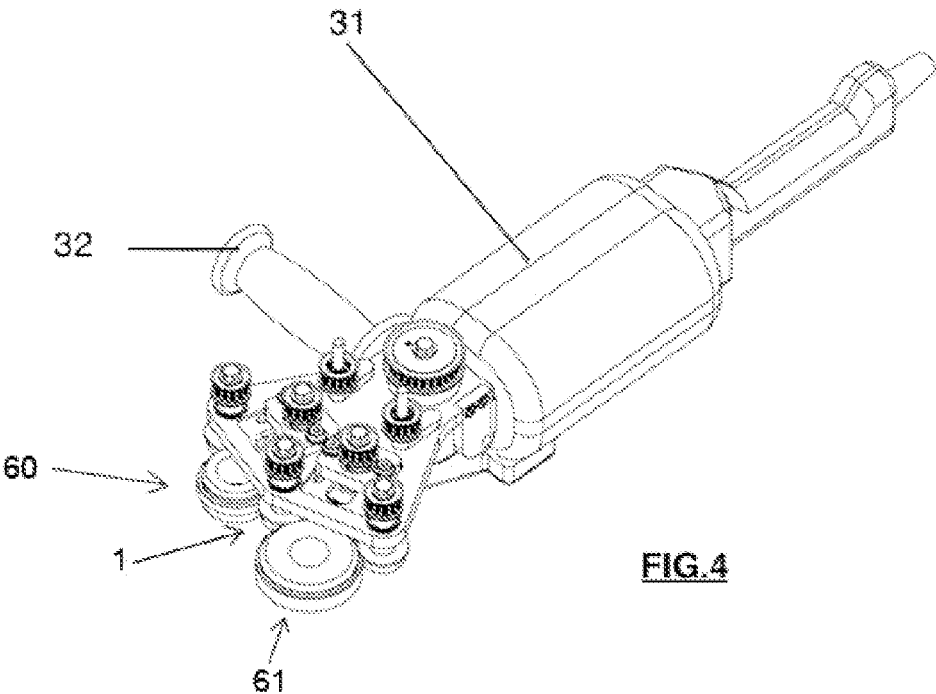
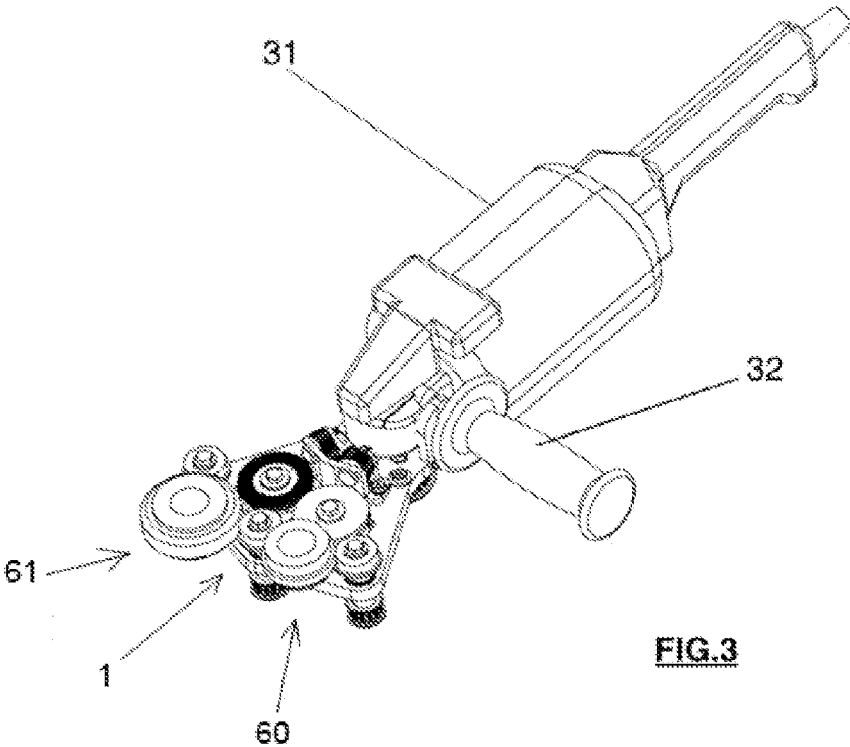
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The invention relates to a tool for cleaning rollers (2a, 2b) of machines for closing container or cans, which comprises a head (1) which is couplable to a motor and on which are mounted: rotary drive discs (14) of the rollers (2a, 2b) to be cleaned and which comprise at least one element for making contact with the rollers, to transmit traction to same; at least one actuator disc (15, 16) that has a different rotation direction and/or rotation speed to the drive discs (14), and which is provided with at least one element for cleaning the rollers (2a, 2b); and a transmission (50) disposed between the motor and the discs (14, 15, 16).









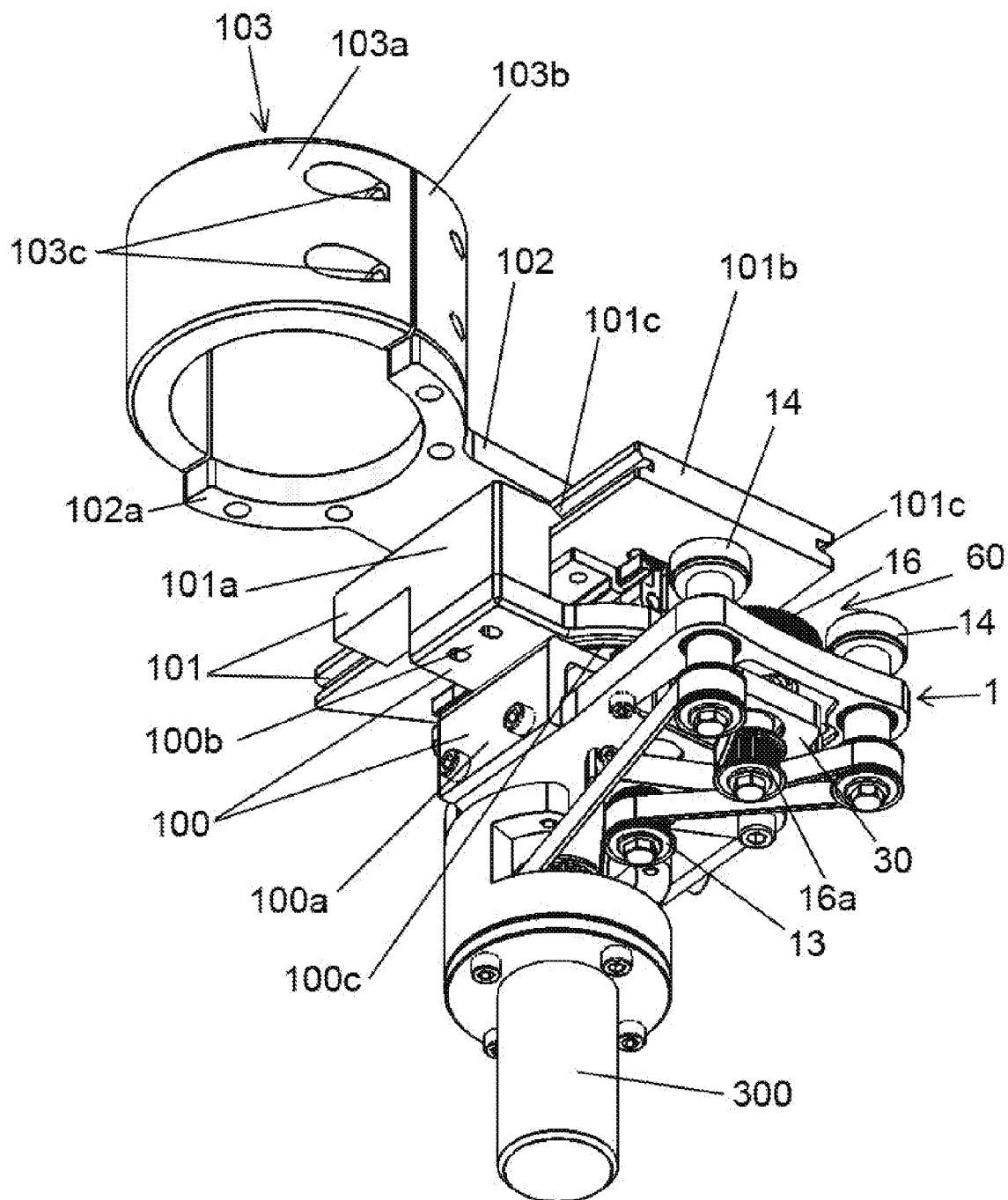


FIG 5

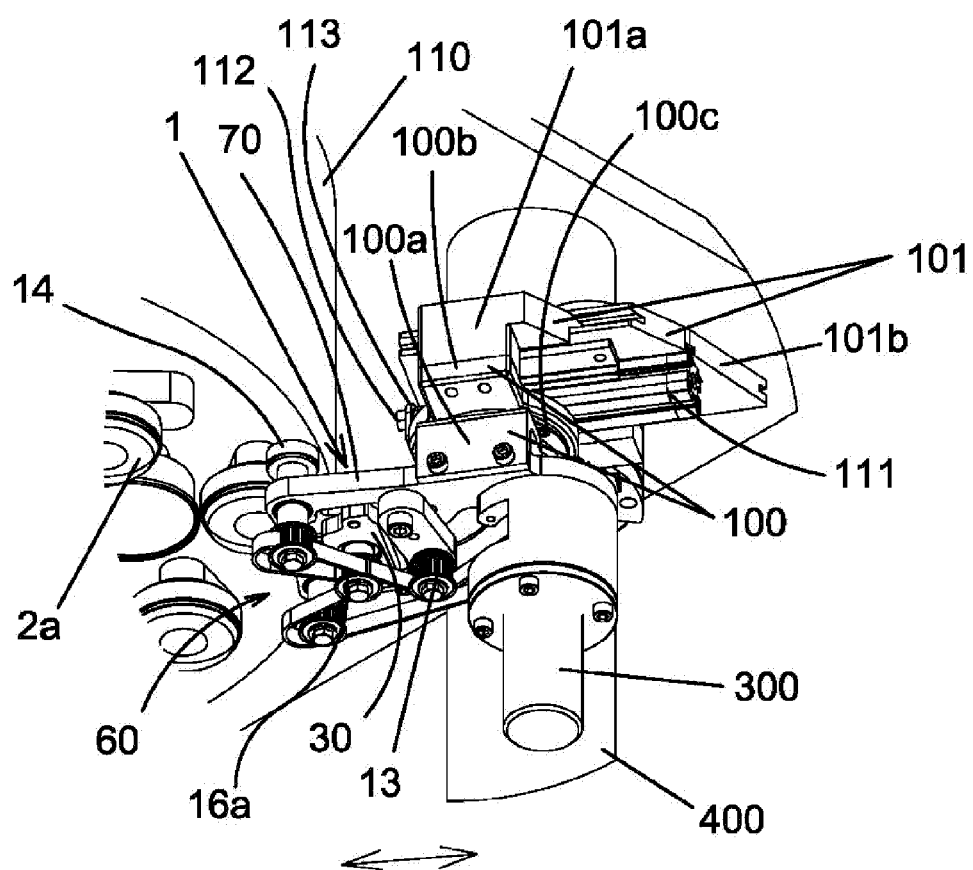


FIG 6

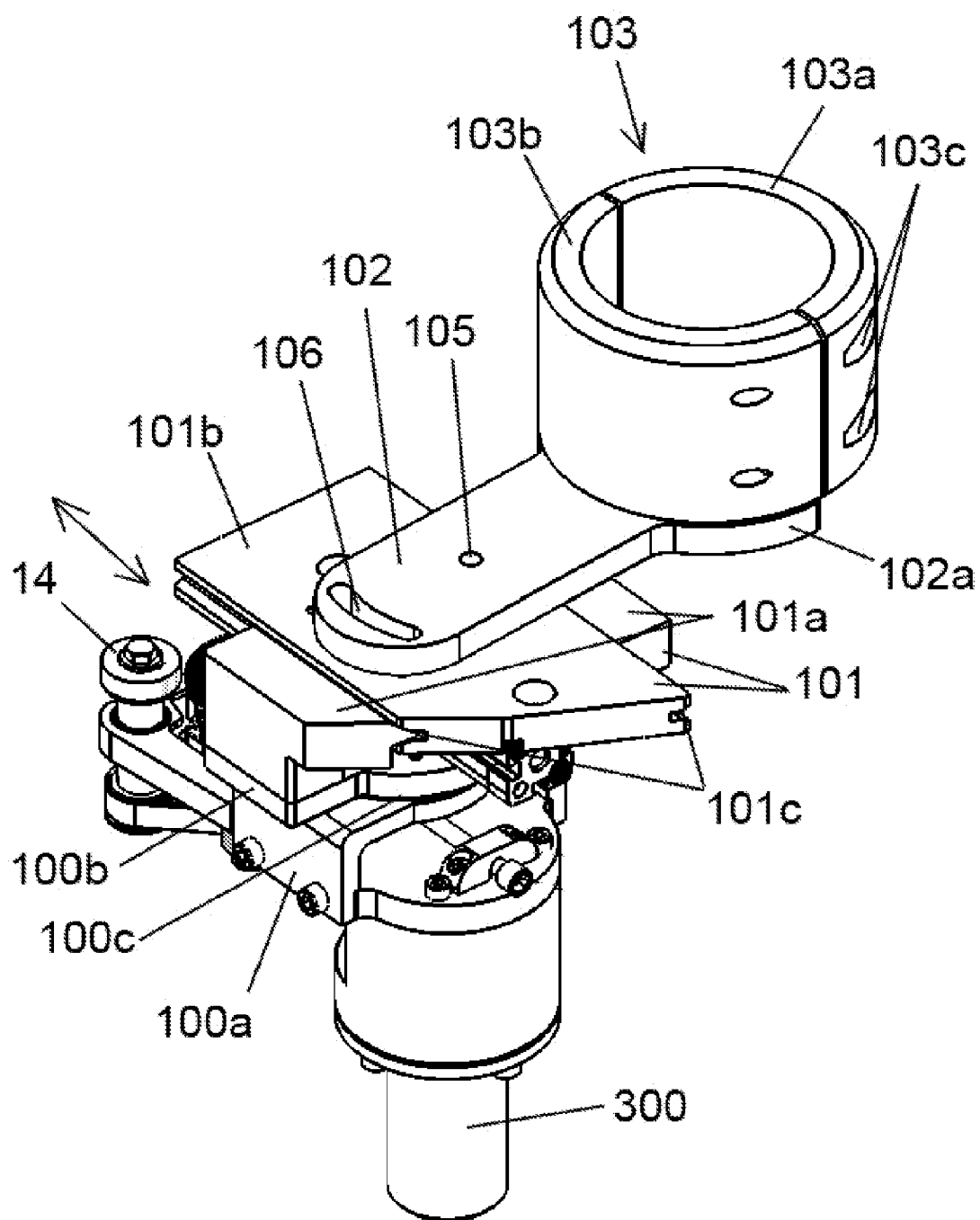


FIG 7

TOOL FOR CLEANING THE ROLLERS OF CONTAINER- OR CAN-CLOSING MACHINES

OBJECT OF THE INVENTION

[0001] The present invention refers to a tool for cleaning the rollers of container- or can-closing machines

BACKGROUND OF THE INVENTION

[0002] The rollers used in container- or can-closing machines in the industry have to be polished regularly for maintenance reasons and to achieve a clean closure without scratches and or varnish which sticks to them when they work.

[0003] At present, in order to polish the rollers, the closing machine has to be stopped and the rollers need to be completely disassembled, with the shaft, bearing and cover being disassembled. This means that, in most cases, the machine has to be completely taken apart in order to remove the roller and clean it. In addition, once the roller has been removed, it has to be transported to a workbench and, after removing the cover and disassembling the shaft, the roller needs to be placed on a lathe or motor, where the roller is polished with sandpaper and diamond paste or different accessories.

[0004] After this operation and as the roller has finished polishing, the shaft and cover are reassembled, in order to be reassembled in the machine, adjusting the roller again to the machine so that the container or can closures are free of scratches. In this regard, an inspection must be carried out by Quality or someone responsible for validating the closures, before the machine can be restarted. This can mean that a series of readjustments is needed until the machine is properly calibrated.

DESCRIPTION OF THE INVENTION

[0005] The tool of the invention is configured in such a way so as to solves the described inconveniences.

[0006] According to the invention, the tool comprises a head that can be coupled to a motor and on which the following are attached:

[0007] tractor discs which rotate on the rollers to be cleaned and which include at least one element in contact with these rollers in order to transmit traction to them,

[0008] at least one actuating disk which rotates in a different direction and/or at a different speed from the tractor disks and which is equipped with at least one element for cleaning the rollers, and

[0009] a transmission arranged between the motor and the discs.

[0010] In this way, it is possible to clean the rollers of the can-closing machines without disassembling them, since it is only necessary to stop the closing machine and bring the tool closer to each roller, making it turn through the tractor discs, while the actuating discs, when turning at a different speed and/or direction, carry out the cleaning, without disassembling or taking apart anything, meaning that the closing machine can be started immediately.

DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 shows a view of the head of the tool of the invention.

[0012] FIG. 2 shows a view of the head of the tool of the invention from a point of view different to that of FIG. 1.

[0013] FIGS. 3 and 4 show the tool of the invention with the head attached from opposite points of view.

[0014] FIG. 5 shows a perspective view of the tool of the invention in a variation with improvements that allow its operation in the closing machine that carries the rollers to be automated.

[0015] FIG. 6 shows a perspective view of the embodiment of the tool in FIG. 5 and its interaction with the closing machine.

[0016] FIG. 7 shows a perspective view from another point of view of the embodiment of the tool of the invention of FIGS. 5 and 6.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] The tool for cleaning the rollers (2a, 2b) of container- or can-closing machines includes a head (1) that can be coupled to a motor, which is not represented in the variation of FIGS. 1 to 4, and on which they are mounted (see FIG. 1):

[0018] tractor discs (14) which rotate the rollers (2a, 2b) to be cleaned, and which comprise at least one element in contact with these rollers to transmit traction to them,—at least one actuating disc (15, 16) which rotates in a different direction and/or at a different speed from the tractor discs (14), and has at least one element for cleaning the rollers (2a, 2b), and

[0019] a transmission (50) (see FIG. 2) arranged between the motor and the discs (14, 15, 16).

[0020] The contact element with the rollers (2a, 2b) provided in the tractor discs (14) includes a rubber or perimeter rubber track provided in each tractor disc (14), since in this way a high coefficient of friction is obtained to transmit the traction by contact. In a very preferential way, each tractor disc (14) has rubber materialised in it, which increases its durability and lowers its cost.

[0021] The head (1) is intended to comprise at least one work station (60, 61), each equipped with two tractor discs (14) and an actuating disc (15, 16) at an angle of between 30 and 180 degrees, so that the rollers (2a, 2b) can be easily inserted in each station (60, 61), as shown in FIGS. 1 to 4. Ideally, the actuating disc (15, 16) of each station (60, 61) is located between the two tractor discs (14), as this ensures good traction and good contact of the corresponding actuating disc. Very preferably the head (1) would comprise two work stations (60, 61), with a common intermediate tractor disc (14) as seen in the figures being shared by both stations (60, 61), since in this way a smaller number of elements is obtained when using some of them together. These stations would comprise (see FIG. 1) a first station (60) where the actuating discs comprise a felt sandpaper disc (15), to which diamond paste is added, not shown, and where the felt can also be replaced by a cloth or page or another accessory for the same purpose, the diamond paste can also have different grains depending on the desired result; and a second station (61) where the actuating discs comprise a disc of flexible strands (16). This second station (61) is used in the first place, as it roughs up the dirt, while the first station (60) is used in the second place to make a fine finish, after which the treated roller will be cleaned. The disc of flexible strands (16) brushes the throat of the roller for about 30 seconds and then attacks the other station provided with felt and diamond

paste, achieving a glossy finish. On the other hand, it should be borne in mind that the can-closing machine has two types of rollers (2a, 2b), one called the first pass and another called the second pass, the throats of which vary in width and depth, in such a way that in the first station (60) two types of felts with different thicknesses may be used to cover the full width of the throat and obtain the proper polish there.

[0022] On the other hand, the transmission (50) preferably comprises (see FIG. 2) some first pulleys (14a) which are joint and coaxial to the tractor discs (14), some second pulleys (15a, 16a) which are joint and coaxial to the actuating discs (15, 16) and a third pulley (11a) driven by the motor shaft (11), comprising a mechanical coupling between these pulleys (11a, 14a, 15a, 16a), in such a way that a single drive jointly moves all the pulleys (11a, 14a, 15a, 16a). This mechanical coupling preferably comprises a toothed belt (70) on both sides, as shown in FIG. 2, while the pulleys (11a, 14a, 15a, 16a) are coplanar and comprise teeth (see figures) to crimp the teeth of this belt (70), achieving a simple and silent configuration of the transmission (50).

[0023] It has been foreseen that the transmission (50) will also include some deflection pulleys (13) which are coplanar with the first pulleys (14a), second pulleys (15a, 16a) and the third pulley (11a) with the timing belt (70) running in the same direction through the first pulleys (14a) of the tractor discs (14) and in the opposite direction the second pulleys (15a, 16a) of the actuating discs (15, 16) so that the tractive discs (14) all rotate in the same direction and the actuating discs (15, 16) rotate in the opposite direction. This makes the speeds of the rollers (2a, 2b) and the actuating discs (15, 16) in each station have a combined action, obtaining a better polishing and thus eliminating the greatest amount of incrustated varnish and any small friction in the closing profile of the rollers (2a, 2b).

[0024] In addition (see FIG. 1), the shafts (17, 18) of the actuating discs (15, 16) are preferably mounted on supports (17a, 18a) guided by guides (20) (see FIG. 2); these supports (17a, 18a) comprising pushers (30) (see FIG. 1) which push the actuating discs (15, 16) against the rollers (2a, 2b). This allows the tool to adapt to rollers (2a, 2b) of different diameters.

[0025] Thanks to the configuration described, the discs (14, 15, 16) are demountable on the head (1). This allows them to be replaced by new ones in case of wear, or with ones with a different grain or finish from the polishing and cleaning, or by other specific ones to give specific treatments to the rollers (2a, 2b). It should be borne in mind that there are different types of sanding grain depending on whether the rollers (2a, 2b) have titanium or not, or on the final customer's taste.

[0026] It should also be noted that the head (1) ideally comprises detachable pins (40) for attachment to the motor, which is equipped with a housing (31)—in the variation of FIGS. 3 and 4—with a handle (32). This motor preferably includes a motor with adjustable speed in order to be able to adjust the speed according to the hardness of the roller or the amount of dirt. Ideally, the motor will be a progressively adjustable speed motor.

[0027] Improvements or updates foreseen for the tool, and described in the following paragraphs, allow its operation to be automated in such a way that it is not even necessary for the operator to come into contact with the closing machine that carries the rollers (2a, 2b) to be cleaned, or with the tool, being able to operate it from the closing machine control

itself, which is not shown, achieving exactly the same functionality of cleaning these rollers (2a, 2b) via polishing to remove varnishes and the like.

[0028] In these improvements (see FIGS. 5 to 7) the head (1) is supported on an upright (100) provided with a slide (101) directed in an interior-outward direction (which can be radial or oblique) with respect to the carousel (110) (see FIG. 6) of rollers (2a, 2b) of the closing machine; this slide (101) comprising a movable half (101a) associated with the head (1) through the upright (100) and a fixed half (101b) provided with means of attachment to a fixed element (400) with respect to the carousel (110) of rollers (2a, 2b); and comprising means of driving the movement of the slide (101) to produce the approximation and separation of the head (1) towards the carousel (110) of rollers (2a, 2b) so that the tractor discs (14) and actuating discs (15, 16) come into contact with the rollers (2a, 2b) when approaching and release them when separating. In this way, the tool is placed in a fixed position with respect to the carousel (110), while being able to be integrated in the same closing machine, and it is possible to automate its operation without the operator having to directly access the work area. A version of this improvement can be seen in FIGS. 5 to 7, where it can be seen that there is only one work station (60), although more than one can be configured as in the manual version, or various tools of the invention can be arranged around the carousel (110) with a single station (60 or 61) and with different or the same actuating discs (15 or 16). In these improvements, moreover, the motor (300) is preferably fixed to the head (1) and can be electric, hydraulic or pneumatic.

[0029] Ideally the upright (100) comprises a first sector (100a) attached to the head (1), a second sector (100b) attached to the moving half (101a) of the slide (100), and a vertical axis joint (100c) (preferably central) which is located by joining both sectors (100a, 100b), in such a way that, providing sufficient amplitude of rotation to the vertical joint (100c), it allows the position of the station (60) to be adjusted to the roller (2a, 2b) to be polished, regardless of whether it is a first or second step roller—which have different radii—since the rotation of the vertical joint (100c) will allow the roller (2a or 2b) to be seated between the tractor discs (14) and the relevant actuating disc (15 or 16), in combination with the action of the corresponding pusher (30).

[0030] It is also envisaged that the halves (101a, 101b) of the slide (101) will preferably be coupled together by means of V-section guides (101c) to improve sliding. The use of any linear guidance device, such as guides or the use of an unrepresented pneumatic or electric linear table, is also considered equivalent.

[0031] As can be seen in FIG. 7, in the preferred variation of these improvements, the fixed half (101b) of the slide (101) comprises a connection to an arm (102) provided with an external end (102a) with a removable and adjustable vertical fixing ring (103) (made up of two half-rings (103a, 103b) joined with tightening screws (103c), for example, to the fixed element (400) with respect to the carousel (110). The connection to the arm (102) ideally comprises (see FIG. 7) an intermediate pivoting clamping shaft (105) and a turning stop (in this case configured by a recess (106) through which a pivot, not shown, runs, so that the position in relation to the pivoting clamping shaft (105) can be adjusted to the optimum position of the tool in relation to the carousel (110) and then immobilised by tightening the pivot.

[0032] The means of actuating the slide movement (101) comprise at least one pneumatic or hydraulic cylinder (111) (see FIG. 6), which can be double-acting as in this case, or it could also be single-acting with the placement of a recovery spring, not shown in this case. FIG. 6 shows how on the head of its piston there is a nut (112) for fixing to a flange (113) of the second sector (100b) of the upright (100), which being connected to the moving half (101a) of the slide (101) produces the displacement of the latter with respect to its fixed half (101b), while the cylinder itself (111) is connected to the fixed half (101b) of the slide (101) as shown in FIG. 6.

[0033] The arrangement of non-represented motion control elements, such as limit switches, photocells, etc., is provided for the control of movements with personal and mechanical safety. The scope of the invention is also understood to include any equivalent solution known in the state of the art, to produce the movements of its mechanical elements in general. In these improvements the motor (300) can logically also be of adjustable speed.

[0034] Once the nature of the invention has been sufficiently described, as well as the manner in which it is carried out in practice, it should be noted that the provisions previously indicated and represented in the attached drawings may be modified in detail insofar as they do not alter the fundamental principle.

1. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines; characterised in that it includes a head (1) that can be coupled to a motor and on which the following are mounted:

tractor discs (14) which rotate the rollers (2a, 2b) to be cleaned, and which comprise at least one element in contact with these rollers to transmit traction to them,—at least one actuating disc (15, 16) which rotates in a different direction and/or at a different speed from the tractor discs (14), and has at least one element for cleaning the rollers (2a, 2b), and

a transmission (50) arranged between the motor and the discs (14, 15, 16).

2. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1 characterised in that the contact element with the rollers (2a, 2b) provided in the tractor discs (14) includes a rubber or perimetral rubber track provided in each tractor disc (14).

3. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 2 characterised in that each tractor disc (14) is materialised in rubber.

4. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1 characterised in that the head (1) comprises at least one work station (60, 61), each of them equipped with two tractor discs (14) and an actuating disc (15, 16) which are at an angle between 30 and 180 degrees.

5. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 4 characterised in that the actuating disc (15, 16) of each station (60, 61) is located between the two tractor discs (14).

6. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 5 characterised in that the head (1) comprises two work stations (60, 61), with an intermediate common tractor disk (14) being shared by both stations (60, 61).

7. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 6 characterised in

that it has a first station (60) where the actuating discs include a felt sandpaper disc (15).

8. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 6 characterised in that it includes a second station (61) where the actuating discs include a disc of flexible strands (16).

9. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1 characterised in that the transmission (50) comprises first pulleys (14a) which are joint and coaxial to the tractor discs (14), second pulleys (15a, 16a) which are joint and coaxial to the actuating discs (15, 16) and a third pulley (11a) driven by the motor shaft (11); including a mechanical coupling between these pulleys (11a, 14a, 15a, 16a).

10. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 9 characterised in that the mechanical coupling comprises a toothed belt (70) on both sides, while the pulleys (11a, 14a, 15a, 16a) are coplanar and comprise teeth for crimping the teeth of this belt (70).

11. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 10 characterised in that the transmission (50) also includes some deflection pulleys (13) which are coplanar with the first pulleys (14a), second pulleys (15a, 16a) and the third pulley (11a) with the timing belt (70) running in the same direction through the first pulleys (14a) of the tractor discs (14) and in the opposite direction the second pulleys (15a, 16a) of the actuating discs (15, 16) so that the tractive discs (14) all rotate in the same direction and the actuating discs (15, 16) rotate in the opposite direction.

12. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 10 characterised in that the shafts (17, 18) of the actuating discs (15, 16) are mounted on supports (17a, 18a) guided by guides (20); these supports (17a, 18a) include pushers (30) that push the actuating discs (15, 16) against the rollers (2a, 2b).

13. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1 characterised in that the discs (14, 15, 16) are mounted removably on the head (1).

14. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1, characterised in that the head (1) comprises fixing pins (40) which can be detached from the motor, which is provided with a handling housing (31) with a handle (32).

15. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1, characterised in that the motor comprises an adjustable speed motor.

16. Tool for cleaning the rollers (2a, 2b) of container- or can-closing machines, according to claim 1 characterised in that the head (1) is supported on an upright (100) provided with a slide (101) directed in an interior-exterior direction with respect to the rollers carousel (110) (2a, 2b); this slide (101) comprising a moving half (101a) associated with the head (1) and a fixed half (101b) provided with means of attachment to a fixed element (400) with respect to the carousel (110) of rollers (2a, 2b); and comprising means of driving the movement of the slide (101) to produce the approximation and separation of the head (1) towards the carousel (110) of rollers (2a, 2b) so that the tractor discs (14) and actuating discs (15, 16) come into contact with the rollers (2a, 2b) when approaching and release them when separating.

17. Tool for cleaning the rollers (**2a**, **2b**) of container- or can-closing machines, according to claim **16** characterised in that the motor (**300**) is fixed to the head (**1**).

18. Tool for cleaning the rollers (**2a**, **2b**) of container- or can-closing machines, according to claim **16** characterised in that the upright (**100**) comprises a first sector (**100a**) attached to the head (**1**), a second sector (**100b**) attached to the moving half (**101a**) of the slide (**100**), and a vertical axis joint (**100c**) that joins both sectors (**100a**, **100b**).

19. Tool for cleaning the rollers (**2a**, **2b**) of container- or can-closing machines, according to claim **16** characterised in that the fixed half (**101b**) of the slide (**101**) includes a connection to an arm (**102**) provided with an external end (**102a**) with a ring (**103**) which is vertical to the fixed element (**400**) with respect to the carousel (**110**).

20. Tool for cleaning the rollers (**2a**, **2b**) of container- or can-closing machines, according to claim **16** characterised in that the means of actuation of the movement of the slide (**101**) comprise at least one pneumatic or hydraulic cylinder (**111**).

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